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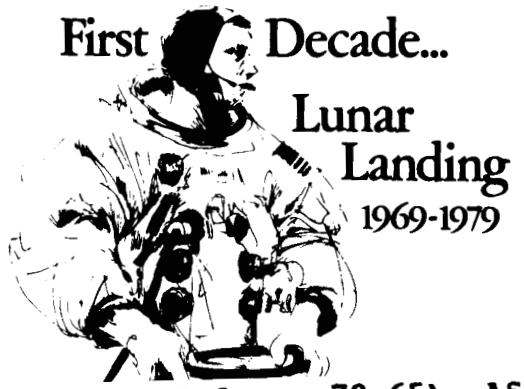

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ASTRONOMY SATELLITE OBTAINS FIRST X-RAY BURST PICTURE

For the first time, the X-ray telescope aboard NASA's High Energy Astronomy Observatory 2 has photographed an X-ray "burster", one of the most bizarre celestial phenomena ever observed.

X-ray bursters are relatively rare. Compact objects with an apparent diameter of less than 50 kilometers (30 miles), bursters are characterized by sudden, very intense increases in X-ray brightness.

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A typical X-ray burst releases more X-ray energy in 10 seconds than our Sun does in an entire week. And despite a great deal of observational and theoretical study in the three years since X-ray bursters were discovered, their nature is still not understood. The bursts may arise from explosions similar to a helium bomb on the surface of a neutron star or from violent instabilities in the flow of gas down a black hole (see Glossary).

The picture was obtained in March by Jonathan Grindlay and other X-ray astronomers at the Harvard-Smithsonian Center for Astrophysics in Cambridge, Mass. The object was observed for 20 minutes, although the burst itself lasted only about 50 seconds. The object is located within 2 arc seconds of the center of a globular cluster called Terzan 2. Globular clusters are spectacular round swarms of, typically, 100,000 stars and are the oldest objects in our galaxy.

Thus, in one 20-minute observation with the X-ray observatory, nicknamed Einstein by scientists, the existence of a "steady" and bursting X-ray source in the globular cluster was established, confirming an identification suggested earlier by Grindlay. This brings the known number of globular clusters containing X-ray sources to at least eight, of which at least six are also bursters; more than 130 globular clusters are known in our galaxy.

According to Grindlay, recent discoveries made it clearer than ever that something remarkable is occurring in the cores of globular clusters. It may be that they have collapsed to form massive black holes, or it may be that compact binary systems containing either neutron stars or black holes are being formed to produce bursting X-ray sources. The black hole hypothesis predicts that the X-ray sources should be located very near the centers of the globular clusters since, as the heaviest object, the black hole would sink to the cluster center.

X-ray bursters were first discovered by Harvard-Smithsonian instruments aboard a Dutch/U.S. cooperative satellite in 1976.

Photographs to illustrate this news release will be distributed without charge only to media representatives in the United States. They may be obtained by writing or phoning:

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GLOSSARY

Pulsars and Neutron Stars

Discovered in 1967, pulsars are stars which emit radio signals in extremely precise pulses. The bulk of available evidence suggests that pulsars may be fast-spinning neutron stars. These are compact bodies of densely packed neutrons (atomic particles having no electric charge), believed to form when a large star burns up much of its fuel and collapses. Containing the mass of a star in a sphere 16 km (10 mi.) in diameter, they are so closely packed that a spoonful of material from the center would weigh a billion tons.

Black Holes

These are believed to be the final stages in the collapse of a dying star. The star's material is so densely packed -- even more so than a neutron star -- and its gravitational force so great that even light waves are unable to escape. Black holes have been hypothesized but conclusive observations have not yet been possible.

Quasars

Astronomers are still baffled by the nature of quasars, but many believe that among observable objects they are the most remote in the universe. They look like stars when viewed through an optical telescope but emit more energy than the most powerful galaxies known. According to calculations, if they are as distant as many astronomers think they are, the total energy emitted by a quasar in one second would supply all of Earth's electrical energy needs for a billion years.

Radio Galaxies

Located on the fringes of visibility, radio galaxies emit radio waves millions of times more powerful than the emissions of a normal spiral galaxy. No one knows what these peculiar galaxies are. Several of them broadcast with such power that a sizable fraction of the nuclear energy locked up in their matter must be going completely into the production of radio waves.

Supernovae

Supernovae are large stars at their lives' ends whose final collapses are catacylsmic events that generate violent explosions, blowing the surface layers of the stars out into space. There, the materials of the exploded stars mix with other material of the universe (primarily hydrogen). Later in the history of the galaxy, other stars are formed out of this mixture. The Sun is one of these stars; it contains debris of countless others that exploded before the Sun was born.

There is strong evidence that supernovae (exploding stars) and pulsars are X-ray sources at some time in their history and that X-rays have been observed from radio galaxies and quasars.

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